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I. INTRODUCTION

In 2001, the Wisconsin Department of Transportation (WisDOT) contracted with KL Engineering to conduct a Needs Assessment of U.S. Highway 51 (USH 51), between Interstate Highway 39/90/94 and Terminal Drive, located south of USH 12/18 (the Beltline). This portion of USH 51, known as Stoughton Road (see Exhibit 1 – Map of Study Area), is the main north-south corridor for travel on the east side of Madison. It provides vital access to major employment and residential areas and is also important to the movement of regional traffic to outlying communities. The roadway intersects with the busiest east-west arterial in the City, East Washington Avenue, another U.S. Highway (USH 151). Stoughton Road is a major factor in the mobility of traffic on the east side of Madison. As USH 51, it is also a designated the "Blue Route". This means it is used as an alternate route for traffic in case of emergency incidents on the Interstate System around Madison.

A. GOALS AND OBJECTIVES OF STUDY

The goals of the study are as follows:

- Collect data on existing conditions to provide adequate information to evaluate the corridor and accurately identify needs.
- Project future conditions to evaluate future needs.
- Involve the community in determining the needs for the corridor through extensive public outreach.
- Share information with the community/stakeholders about the existing and future conditions.
- Determine the level of involvement of the adjacent, impacted units of government.
- Identify the types of traffic the corridor currently serves and which types it needs to serve in the future.

This study assessed the motor vehicle, bicycle, pedestrian, and mass-transit needs of the Stoughton Road corridor and identified them based on safety, capacity, and mobility. Needs were determined by current conditions and conditions that will result from "full build-out" of the study area, projected to occur by the year 2030.

No longer-term solutions to the identified needs have been explored as part of this study. Some short-term, low-cost solutions that can be implemented quickly have been identified for further study. A subsequent study will be initiated to look at longer-term solutions to the major problems identified in this Needs Assessment.

B. WHY STOUGHTON ROAD IS BEING STUDIED

WisDOT initiated the Needs Assessment for several reasons. Significant back-ups on USH 51 during rush hour, complaints of diverted traffic through neighborhoods voiced by the local residents, a growing number of crashes in the project area, and increasing congestion on IH 39/90/94 are some of the problems that spurred the study. Growth trends in Dane County, and on Madison's east side suggest that the current facility will not be able to meet local and regional traffic needs in the future.

As defined by the Stoughton Road Corridor Needs Analysis Technical Advisory Committee and Policy Advisory Committee the reasons for completing the study are:

1. **The entire project area has never been addressed as a whole.** Improvements have been made to different areas of Stoughton Road at different times. The speed limit changes several times. Some sections are built as freeways or expressways, while other sections are signalized and function as local roadways. This study will consider the needs of the entire corridor at the same time.
2. **Present traffic volumes are high and planned development will contribute to additional increases.** The ability to get to and from desired services has a significant impact on neighborhoods and businesses. Currently the roadway handles vehicles with a diverse mix of commuter, local, and inter-regional destinations. The impacts of future growth on the project area and the roadway have to be determined.
3. **Traffic congestion has increased.** This is especially evident during the morning and afternoon rush hours. The roadway is at a point where small incidents can cause large traffic delays.
4. **Stoughton Road needs to provide for pedestrians and bicycles.** Safe crossings and parallel routes are important to maintaining bicycle and pedestrian movements through the corridor and connecting to the rest of Madison. With continued development in the corridor and increased traffic volumes, providing these opportunities for alternative means of travel will be a challenge.

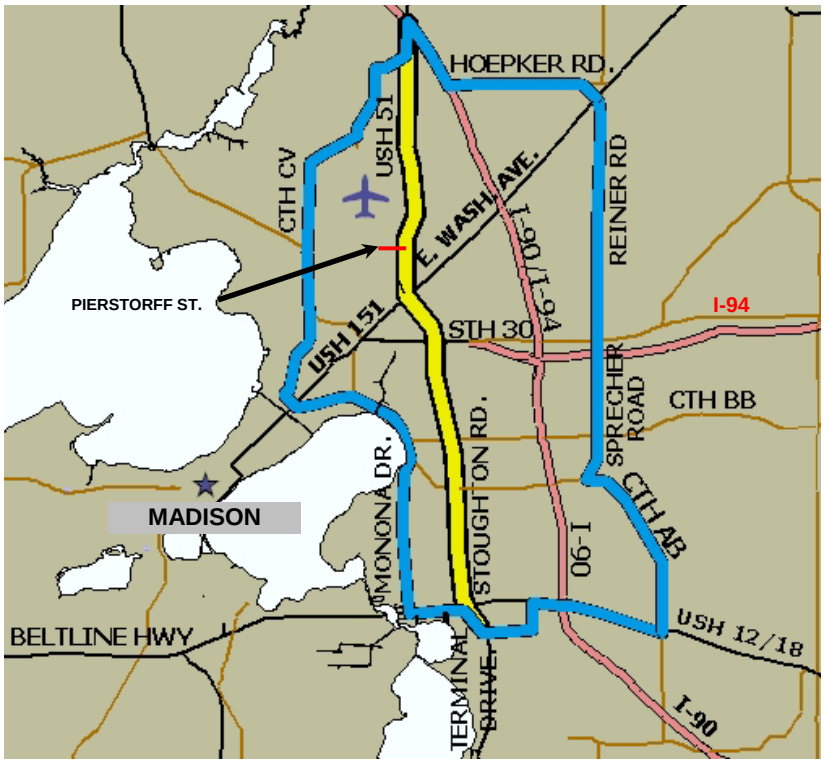
In addition, WisDOT has concerns about the amount of traffic that is being diverted to IH 39/90/94 because of increasing congestion on Stoughton Road. The IH 39/90/94 route between Milwaukee and Minneapolis-St. Paul was constructed in the late 1950's and early 1960's as part of the nationwide interstate construction initiative. As its name implies, the purpose of the I-system is to provide a continuous, free-flowing system of highways that can carry large volumes of traffic from one region of the country to the next. The system was deliberately designed to provide a limited number of access points, so that its function as a long-distance route would be preserved.

When the portion of IH 39/90/94 that is in Dane County was constructed, it was 1.5 miles from Madison's urban edge. As that edge has crept farther north and east, and other routes have become congested, drivers have begun to use IH 39/90/94 for trips within Dane County that would have been made on Stoughton Road in the past. IH 39/90/94 is essential to supporting the state's economy in its function as a long distance route. Hence, WisDOT has become increasingly concerned as the I-system's capacity is being used for these local/regional trips.

C. STUDY AREA

The Stoughton Road Needs Assessment study area begins at Terminal Drive/Voges Road in McFarland and continues for 9.8 miles north to the interchange with IH 39/90/94. The project study area encompasses essentially the entire east side of Madison. It includes the area from Reiner Road, Sprecher Road, and CTH AB at the east limit; and CTH CV, Packers Avenue, and Monona Drive, to the west. This area was selected to include the roadways, neighborhoods, and development plans that impact travel on Stoughton Road. The study, however, focuses on the needs of the Stoughton Road corridor and how future development will impact Stoughton Road.

EXHIBIT 1 MAP OF STUDY AREA



D. STOUGHTON ROAD FUNCTION

It is obvious from the construction history that Stoughton Road has never been evaluated in its entirety. From the Beltline to Buckeye Road the roadway is part rural arterial and part urban collector. For the most part, the roadway is a rural cross-section with a 55 mph posted speed. However, the signalized intersections at Pflaum Road and Buckeye Road give access to two-lane collector roadways. The section from north of Buckeye Road through Milwaukee Street is an urban freeway. From the STH 30 interchange to Pierstorff Street the roadway is an urban arterial with up to 6 lanes, posted 35 or 45 mph and signals at every intersection. North of Pierstorff Street the roadway is a rural expressway posted at 55 mph until it reaches the CTH CV and IH 39/90/94 area. At that point it again functions as an urban arterial posted at 45 mph with signals at the CTH CV intersection.

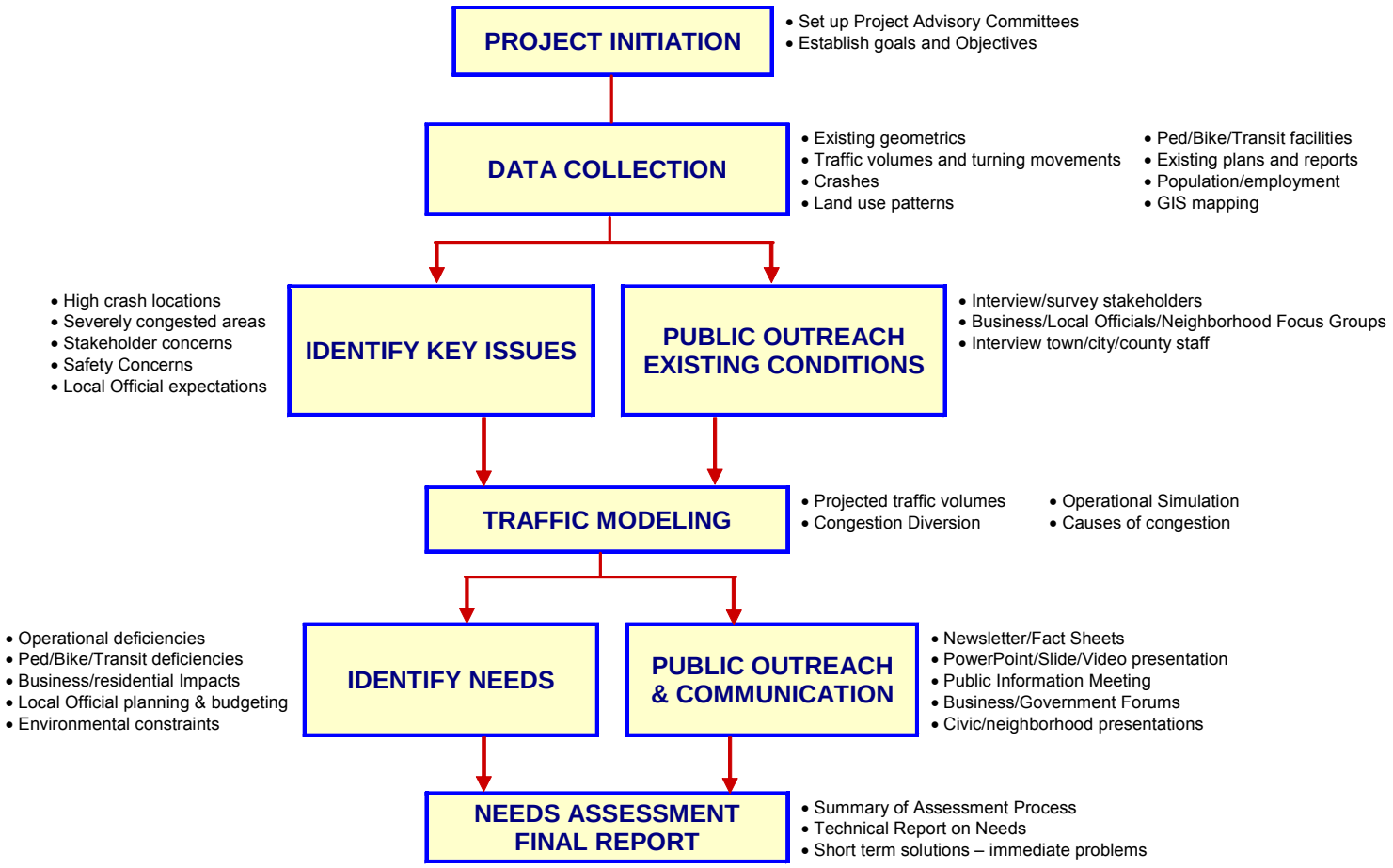
Stoughton Road is USH 51, intended to meet the needs of travelers with regional destinations. It is also a significant north-south roadway for local traffic. This means that Stoughton Road has dual, sometimes conflicting, functions. A local roadway needs to provide access, but providing access can conflict with the mobility demands of a regional roadway. Currently these demands are not being met by Stoughton Road. Travelers with regional destinations that could easily use Stoughton Road are diverting to the Interstate System for their regional trips, due to long delays at peak hours. Drivers making local trips become frustrated with the delays on Stoughton Road and divert to local streets that were not designed to handle high volumes of traffic.

E. STUDY PROCESS AND SCHEDULE

Study Process

The chart in Exhibit 2 summarizes the process followed for this Needs Assessment. The main elements of the study were the Data Collection, Traffic Modeling, and Public Outreach. An overview of these items is provided here. They are explained in further detail later in the report.

EXHIBIT 2 STUDY PROCESS



In the **Project Initiation** phase, members of the Technical and Policy Advisory Committees were identified. A resolution for the formation of the Policy Advisory Committee (PAC) was provided to the City of Madison and eventually ratified by the Common Council. The Goals and Objectives of the Study were determined. Also a logo identifying the project was developed, to make the project information recognizable to the public.

During the **Data Collection** phase, information about the existing and proposed conditions on Stoughton Road was collected. Information gathered was used to create a picture of what Stoughton Road is like now and will be like in 2030. Some key issues were identified and the initial **Public Outreach** began. Bicycle and Pedestrian, Business, and Neighborhood Workshops were held. Public Opinion Surveys were distributed at the workshops and to businesses within the corridor. Concerned business owners were interviewed about the current conditions on Stoughton Road. Several meetings were held with the Technical Advisory

Committee (TAC) and input was received regarding current conditions and future plans for the project area.

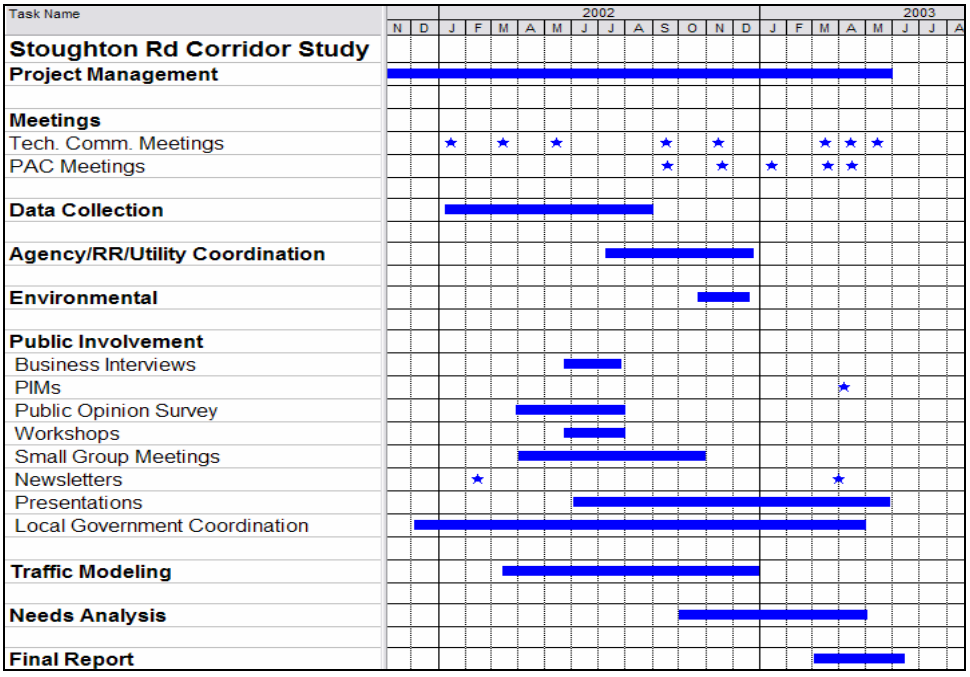
Traffic Modeling began almost immediately after the traffic volume counts were completed using the Madison Metropolitan Planning Organization (MPO) Tranplan model for the City. After the model was calibrated and acceptable output for the year 2002 was obtained, work on the 2030 model was begun. Results of the 2030 Tranplan model indicated where future deficiencies would occur. The **Public Outreach** phase continued with distribution of a newsletter that included an invitation to the Public Information Meetings. It provided preliminary findings of the study and was distributed to nearly all residents and businesses in the project area.

After the three Public Information Meetings, additional PAC and TAC meetings were held to discuss potential short-term solutions. Finally, this **Technical Report** was completed and distributed for comment to the PAC, TAC, WisDOT, and concerned municipalities for comment. This final report is the basis for the future approach to addressing the needs identified.

Schedule

Provided in Exhibit 3 is a graphic representation of the Project Schedule.

EXHIBIT 3 PROJECT SCHEDULE



This report completes the Study which began in November of 2001 as shown above. Subsequent phases and short-term improvements will be initiated in the near future. Large-scale improvements are currently not part of WisDOT's six-year program.

F. DATA COLLECTION

The project was undertaken to determine the deficient areas in the Stoughton Road transportation system. Extensive research was done to provide an accurate representation of the project corridor under current (2002) and future (2030) conditions. The following is a summation of major items that were a part of the Data Collection process.

Corridor geometrics were determined from "As-Built" plans and field survey. The existing number of lanes, lane-widths, median locations and widths, shoulder widths, frontage roads proximity, and speed limits for corridor roadways were identified. These included the intersection geometrics (turn lane lengths and movements, tapers, island configuration, radii, number and location of curb cuts, parking areas, bus stops, type of intersection control, and general observation of traffic issues during peak hours) for all the major intersections along Stoughton Road (see Exhibit 4 for examples). Intersection inventory sheets for the study corridor are included in Technical Appendix 1. Interchange geometrics (ramp configurations including ramp lengths, tapers, and radii, number of lanes, lanes widths, and island configurations) were also determined for the South Beltline, Milwaukee Street, USH 30, and IH 39/90/94. An inventory of existing signs and markings on Stoughton Road and on side road approaches was done.

Using information from WisDOT, City of Madison, and field surveys, signal timings were determined at the signalized intersections. Traffic volumes/intersection turning movement counts were field collected to supplement, as necessary, WisDOT, City of Madison and the MPO's collected traffic data (Peak Hour and Average Daily Traffic). WisDOT had collected data at several locations in the corridor by placing Automatic Traffic Recording tubes at various locations. Turning movement counts at the study intersections were taken during the afternoon peak period, with 15-minute summaries (automobiles, trucks, buses, pedestrians, and bicycles). The peak hour times, peak hour volumes for each turning movement, peak hour factor for each approach, and truck percentages were then determined. These volumes were then projected for year 2030 conditions. The corridor geometric items were input to the MPO Tranplan model to determine current and future Levels of Service, travel times, speeds, and queues within the corridor.

A highway deficiency inventory, including bridge and pavement sufficiency was prepared using "As-Built" plans and the most recent WisDOT inspection reports. Areas that do not meet current Facilities Development Manual (FDM), Bridge Manual, and AASHTO standards for alignment, profile, clear zone, lane geometrics and sufficiency rating were noted and are detailed later in this report.

Crash rates were calculated and high-incident areas were noted within the corridor based on the 5-year history provided by WisDOT. Further details are provided in Section V. A. Crash Analysis (see Exhibit 17).

From WisDOT, City, and County plans, and field survey, existing and proposed bicycle and pedestrian facilities were identified. Barriers, volumes, crosswalk locations, and pedestrian push button locations near the corridor were located. Potential parallel routes and crossing conflicts were noted and a crash analysis for pedestrians and bikes was completed. Existing and planned community & neighborhood facilities - schools, community centers, parks, recreation areas, existing neighborhood associations, boundaries, and contacts - along the corridor were also identified. Existing and potential transit routes within the corridor, including bus, park and ride, high-speed rail, and commuter rail facilities were identified using the City of Madison and Dane County facilities maps, Madison Metro's proposed route maps, and the Transport 2020 study.

Click here for EXHIBIT 4 INTERSECTION INVENTORY SHEETS PDF (960 KB)

Using County, MPO, Census information, and individual property surveys, the nature of residential and business traffic within the area was determined. Employment and population data was then generated for the years 2002 and 2030. Using County information and individual property surveys, business information was developed to determine existing and potential location of major traffic generators within the corridor. A review of the existing reports and neighborhood plans was done. Coordination with related projects including the East Washington Avenue Study, the Marsh Road roadway construction project, the Rieder Road design project, and the STH 30/Thompson Road interchange project were included in the review. Planned developments were also included in the corridor study. These items were major components that were input to the Tranplan model to determine growth projections in the project area.